

Richland County Blue Ribbon Committee

May 5, 2016



Agenda Overview



1. **Welcome**
2. **Recap of the Blue Ribbon Committee Progress**
3. **Update HMGP Progress**
(Hazard Mitigation Grant Program – state funds)
4. **Update FMA Progress**
(Flood Mitigation Assistance – state funds)
5. **Consideration of Initial CDBG-DR Project Categories**
(Community Development Block Grant – Disaster Recovery – federal funds)
6. **Present Flood Mitigation Alternatives Assessment**
7. **Meeting Schedule**
May 5, 2016
May 19, 2016
June 9, 2016
June 23, 2016
July 14, 2016

All meetings are scheduled on Thursdays from 2:00-4:00 PM in the 4th floor conference room at the County Administration building (2020 Hampton Street).

8. **Other**
9. **Adjourn**

Richland County Blue Ribbon Committee Progress to Date



Results from Committee Meeting #1 – February 11



- **Action #1** - Unanimously recommended for Council's consideration the ten priority categories for the Hazard Mitigation Grant Program (HMGP).
- Council Action – Approved as recommended by the Blue Ribbon Committee (BRC).
- Results – These criteria were used to develop a prioritized list of projects for pre-application to the HMGP.
- The following slide reflects the ten priority categories.

Top Ten HMGP Project Categories



Priority Ranking	Project Category
1	Voluntary Residential Property Acquisition/Buyouts
2	Storm Water Drainage Management/Dams
3	Housing Reconstruction/Rehabilitation
4	Voluntary Non-Residential Property Acquisition/Buyouts
5	Data/Offsite IT Infrastructure
6	Flood Studies
7	Mitigation of Flood Damage to Fire Suppression Water Capacity & Supply Systems
8	Conservation Easements
9	Public Outreach
10	Replacing County Emergency Operations Center (EOC)

Results from Committee Meeting #1 – February 11



- **Action #2** - Unanimously recommended County staff to proceed with the Notice of Voluntary Interest form with edits to include:
 - Direct contact information of staff person to answer questions
 - Frequently Asked Questions (FAQ)
- Council Action – Approved as recommended by the BRC.
- Results – Notice of Voluntary Interest form was delivered to affected residents in a timely manner.
 - Residential: Seventy-two (72)
 - Non-Residential: Fifteen (15)

Results from Committee Meeting #2 – February 18



- **Action #1** – Unanimously recommended for Council’s consideration and adoption the HMGP pre-application project list (with two additions) developed from the project category list.
- Council Action- Approved as recommended by the BRC
- Results – Most HMGP pre-applications were submitted by April 5, 2016 for funding consideration. The deadline for submittal is May 5, 2016.
- The following slide reflects
 - Pre-applications submitted to SCEMD for consideration
 - HMGP Pre-Applications at SCEMD for Review

HMGP Pre-Application Submitted to SCEMD

(rows highlighted in blue have been approved to proceed to full application)



Title	Description
Danbury Drive Stabilization	Increase capacity of the regional detention pond to handle the flows in the neighborhood.
Spring Valley Little Jackson Creek Stream Mitigation, Stream Restoration Regenerative Storm water Conveyance	Stabilize and improve the railroad ditch line using regenerative storm water conveyance to mitigate localized flooding.
Soil Stabilization and Storm Water Improvements – Owens Field SW_01	The project will mitigate existing and future flooding impacts by retaining water on-site during storm events. The project needs an additional \$100,000 to complete all of the proposed storm water controls.
Cary Lake Dam Hazard Mitigation	The Gills Creek Watershed Association in partnership with the Cary Lake Homeowners Association, proposes to strengthen and enhance the Cary Lake Dam by armoring the earthen portion of the dam.
Spring Lake Dam Hazard Mitigation	The Gills Creek Watershed Association in partnership with the Spring Lake Company, proposes to strengthen and enhance the Spring Lake Dam by installing a specialized turf reinforcement mat (TRM) and vegetation across the dam.
Acquisition and Demo (NON_RES_ACQ_001)	Acquire and demo nine non-residential structures that are located in the floodway and were substantially damaged.
Acquisition and Demo (NON_RES_ACQ_002)	Acquire and demo six non-residential structures that are located in the floodway and were substantially damaged.
Acquisition and Demo (RES_ACQ_002)	Acquire and demo eight homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_001)	Acquire and demo seventeen homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_003)	Acquire and demo twenty two homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_004)	Acquire and demo sixteen homes located in the special flood hazard area (floodway and flood fringe) that were substantially damaged.
Financial and Human Resource System Disaster Recovery	The county will purchase and install a redundant SAN and necessary switching equipment and attached servers to replicate critical financial and personnel data.
Public Awareness Campaign – Reaching the Digitally Disconnected	Richland County is proposing a project to get the word out to the “digitally disconnected.”
Update Hazard Mitigation Plan	As part of the update to the HMP, the following studies need to be conducted: 1) Storm water infrastructure inventory improvements. 2) Limited detailed study of all unnumbered A Zone areas. 3) Property acquisition policy.
Update Hazard Mitigation Plan	As part of the update to the HMP, the following studies need to be conducted: 1) Baseline aerial inventory. 2) Mapping localized flooding.
Culvert Improvements	Richland County conducted an extensive study of the culverts in the county and identified nine culverts that need to be increased in size to mitigate similar damages from future flooding incidents.

HMGP Pre-Application at SCEMD for Review



Title	Description
Eastover Storm Water Drainage Channel Improvement	<p>There are chronic flooding that impact various areas of the Town of Eastover:</p> <ol style="list-style-type: none"> 1) Involves improvements to 11,000 feet of channel in the existing drainage network improving the drainage to six “Carolina bays.” 2) Involves improving the Solomon Street side swales to promote infiltration and increased flow to the main channel. <p>Total: \$271,176.00 Federal Share: \$203,382.00 Local Share: \$67,794.00</p>
Storm Water Drainage Channel Improvement – Lower Richland County	<p>There are three areas of chronic flooding in unincorporated Lower Richland County. This project will mitigate flooding, improve drainage, and help control mosquito population in the following locations:</p> <ol style="list-style-type: none"> 1) William Janie Simms Circle 2) Congaree Road 3) Cabin Creek Road <p>Total: \$183,088.00 Federal Share: \$137,316.00 Local Share: \$45,772.00</p>
Lake Dogwood (aka Murry Pond) Dam Armoring	<p>The Lake Dogwood Property Owners Association proposes to strengthen and enhance the Lake Dogwood Dam by installing a specialized turf reinforcement mat (TRM).</p> <p>Total: \$100,000.00 Federal Share: \$75,000.00 Local Share: \$25,000.00</p>
Piney Grove Wynn Way Detention Pond	<p>Create a storm water dry detention basin for the Stoop Creek watershed.</p> <p>Total: \$273,577.00 Federal Share: \$205,182.75 Local Share: \$68,394.25</p>
Brookgreen Detention Pond	<p>Create a storm water dry detention BMP for the Stoop Creek watershed.</p> <p>Total: \$474,632.00 Federal Share: \$355,974.00 Local Share: \$118,658.00</p>

Results from Committee Meeting #2 – February 18



- **Action #2** - Unanimously recommended for Council's consideration the demobilization of the Lower Richland County Operations Center.
- Council Action – Approved as recommended by the BRC.
- Results – Reallocated staff resources for more efficient operations.

- **Action #3** - Unanimously recommended for Council's consideration demobilization of the County Donated Goods relief Supply Warehouse.
- Council Action – Approved as recommended by the BRC.
- Results – Services now provided by non-profit organizations with appropriate staffing and expertise.

Results from Committee Meeting #2 – February 18



- **Action #4** - Unanimously recommended for Council's consideration continuing to work with the Council of Governments (COG) to update the current Hazard Mitigation Plan (HMP).
- Council Action – Approved as recommended by the BRC.
- Results – Ensures the County has a current HMP so that it remains eligible for HMGP, and others state/federal funds.

Results from Committee Meeting #2 – February 18



- **Action #5** - Unanimously recommended that the County remain prepared to approve the HMP once completed.
- Council Action – Approved as recommended by the BRC.
- Results – Ensures the County has a current HMP so that it remains eligible for HMGP, and other state/federal funds.

- **Action #6** - Unanimously recommended for Council's consideration three options for the 25% local match for Voluntary Residential Property Acquisition.
- Council Action – Approved as recommended by the BRC.
- Results – Allowed County staff to set public expectations with regard to how the local match would be paid.

Results from Committee Meeting #2 – February 18



- **Action #7** - Unanimously recommended for Council's consideration the adoption of a resolution requesting the State appropriate funding to the County in an amount that is commensurate with the level of damage our County incurred as a result of the flood.
- Council Action – Approved as recommended by the BRC.
- Results – Communicated to the members of the Richland County Delegation the desires of the BRC and County Council for Richland County to receive appropriate levels of funding.
- **Action #8** - Unanimously recommended hiring at no cost to the County one (later updated to two) Community Disaster Recovery Specialist (CDRS).
- Council Action – Approved as recommended by the BRC.
- Results – Hired two CDRS personnel, which provides needed additional staff support.

Results from Committee Meeting #3 – March 10



- **Action #1** - Unanimously recommended for Council's consideration the approval of the Richland County Intermediate Recovery Implementation Plan.
- Council Action – Approved as recommended by the BRC.
- Results – Guides the County's recovery effort while maintaining compliance with Federal and State recovery requirements.

Results from Committee Meeting #3 – March 10



- **Action#2** - Unanimously recommended for Council's consideration the adoption of the public and stakeholder outreach process that included nine public outreach meetings and four stakeholder engagement meetings.
- Council Action – Approved as recommended by the BRC with the addition of a tenth public outreach meeting.
- Results – Provides ample opportunities for all the County residents and stakeholders to provide input to County staff and elected officials on the use of Community Development Block Grant – Disaster Recovery funds.
- ***Schedule of meetings to be publicized when CDBG-DR instructions are released by HUD***

Results from Committee Meeting #3 – March 10



- Public Outreach Meeting Locations:
 - St. Andrews Park
 - Trenholm Park
 - Parklane Road Adult Activity Center
 - Richland County Administration Building (2020 Hampton)
 - North Springs Park
 - Crane Creek Community Center
 - Gadsden Park Community Center
 - Eastover Park
 - Lower Richland Road – County Sheriff Substation
 - Dutch Fork area
- Four Stakeholder engagement Meetings
 - Invite individuals and agencies representing a cross-section of community leaders, government officials, faith-based organizations, non profit organizations, business leaders, etc. to provide input into the flood recovery needs of their respective areas.

Richland County Update HMGP Projects



Top Ten HMGP Project Categories



Priority Ranking	Project Category
1	Voluntary Residential Property Acquisition/Buyouts
2	Storm Water Drainage Management/Dams
3	Housing Reconstruction/Rehabilitation
4	Voluntary Non-Residential Property Acquisition/Buyouts
5	Data/Offsite IT Infrastructure
6	Flood Studies
7	Mitigation of Flood Damage to Fire Suppression Water Capacity & Supply Systems
8	Conservation Easements
9	Public Outreach
10	Replacing County Emergency Operations Center (EOC)

HMGP Pre-Application Submitted to SCEMD

(rows highlighted in blue have been approved to proceed to full application)



Title	Description
Danbury Drive Stabilization	Increase capacity of the regional detention pond to handle the flows in the neighborhood.
Spring Valley Little Jackson Creek Stream Mitigation, Stream Restoration Regenerative Storm water Conveyance	Stabilize and improve the railroad ditch line using regenerative storm water conveyance to mitigate localized flooding.
Soil Stabilization and Storm Water Improvements – Owens Field SW_01	The project will mitigate existing and future flooding impacts by retaining water on-site during storm events. The project needs an additional \$100,000 to complete all of the proposed storm water controls.
Cary Lake Dam Hazard Mitigation	The Gills Creek Watershed Association in partnership with the Cary Lake Homeowners Association, proposes to strengthen and enhance the Cary Lake Dam by armoring the earthen portion of the dam.
Spring Lake Dam Hazard Mitigation	The Gills Creek Watershed Association in partnership with the Spring Lake Company, proposes to strengthen and enhance the Spring Lake Dam by installing a specialized turf reinforcement mat (TRM) and vegetation across the dam.
Acquisition and Demo (NON_RES_ACQ_001)	Acquire and demo nine non-residential structures that are located in the floodway and were substantially damaged.
Acquisition and Demo (NON_RES_ACQ_002)	Acquire and demo six non-residential structures that are located in the floodway and were substantially damaged.
Acquisition and Demo (RES_ACQ_002)	Acquire and demo eight homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_001)	Acquire and demo seventeen homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_003)	Acquire and demo twenty two homes that are clustered together, located in the special flood hazard area (floodway and flood fringe) and were substantially damaged.
Acquisition and Demo (RES_ACQ_004)	Acquire and demo sixteen homes located in the special flood hazard area (floodway and flood fringe) that were substantially damaged.
Financial and Human Resource System Disaster Recovery	The county will purchase and install a redundant SAN and necessary switching equipment and attached servers to replicate critical financial and personnel data.
Public Awareness Campaign – Reaching the Digitally Disconnected	Richland County is proposing a project to get the word out to the “digitally disconnected.”
Update Hazard Mitigation Plan	As part of the update to the HMP, the following studies need to be conducted: 1) Storm water infrastructure inventory improvements. 2) Limited detailed study of all unnumbered A Zone areas. 3) Property acquisition policy.
Update Hazard Mitigation Plan	As part of the update to the HMP, the following studies need to be conducted: 1) Baseline aerial inventory. 2) Mapping localized flooding.
Culvert Improvements	Richland County conducted an extensive study of the culverts in the county and identified nine culverts that need to be increased in size to mitigate similar damages from future flooding incidents.

HMGP Pre-applications Roll-up



Priority	Federal Share	Local Share	Projects
1	\$4,437,365.63	\$1,479,121.88	32, 33, 34, 35
2	\$3,043,126.50	\$1,014,375.50	25, 26, 28, 29, 95, 141, 142, 143, 175, 176
3	\$0.00	\$0.00	
4	\$3,051,838.13	\$1,017,279.38	30, 31
5	\$0.00	\$0.00	
6	\$0.00	\$0.00	
7	\$0.00	\$0.00	
8	\$0.00	\$0.00	
9	\$150,000.00	\$50,000.00	48
10	\$0.00	\$0.00	
Totals	\$10,682,330.26	\$3,560,776.76	

HMGP Pre-Application at SCEMD for Review



Title	Description
Eastover Storm Water Drainage Channel Improvement	<p>There are chronic flooding that impact various areas of the Town of Eastover:</p> <ol style="list-style-type: none"> 1) Involves improvements to 11,000 feet of channel in the existing drainage network improving the drainage to six “Carolina bays.” 2) Involves improving the Solomon Street side swales to promote infiltration and increased flow to the main channel. <p>Total: \$271,176.00 Federal Share: \$203,382.00 Local Share: \$67,794.00</p>
Storm Water Drainage Channel Improvement – Lower Richland County	<p>There are three areas of chronic flooding in unincorporated Lower Richland County. This project will mitigate flooding, improve drainage, and help control mosquito population in the following locations:</p> <ol style="list-style-type: none"> 1) William Janie Simms Circle 2) Congaree Road 3) Cabin Creek Road <p>Total: \$183,088.00 Federal Share: \$137,316.00 Local Share: \$45,772.00</p>
Lake Dogwood (aka Murry Pond) Dam Armoring	<p>The Lake Dogwood Property Owners Association proposes to strengthen and enhance the Lake Dogwood Dam by installing a specialized turf reinforcement mat (TRM).</p> <p>Total: \$100,000.00 Federal Share: \$75,000.00 Local Share: \$25,000.00</p>
Piney Grove Wynn Way Detention Pond	<p>Create a storm water dry detention basin for the Stoop Creek watershed.</p> <p>Total: \$273,577.00 Federal Share: \$205,182.75 Local Share: \$68,394.25</p>
Brookgreen Detention Pond	<p>Create a storm water dry detention BMP for the Stoop Creek watershed.</p> <p>Total: \$474,632.00 Federal Share: \$355,974.00 Local Share: \$118,658.00</p>

Richland County Update FMA Project



Flood Mitigation Assistance (FMA)



- FMA Grant Program was created with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).
- Applicants (with NFIP coverage) are eligible to receive \$100,000 for mitigation planning with a maximum of \$25,000 for local plans.
- The balance of FMA Grant Program funding will be distributed on a competitive basis to all eligible applicants for flood hazard mitigation projects.
- Local governments are considered sub-applicants and must apply to their applicant state/territory.
- Total FY 2016 Amount: \$199 (million)

Flood Mitigation Assistance (FMA)



- Federal funding is available for up to 75% of the eligible activity costs.
- FEMA may contribute up to 100% Federal cost share for SRL (Severe Repetitive Loss) properties. An SRL property is a structure that:
 - Is covered under a contract for flood insurance made available under the NFIP; and
 - Has incurred flood-related damage
 - Four or more separate claims (building and contents) each exceeding \$5,000 with the total of all claims exceeding \$20,000, or
 - At least two separate claims (only building) with the total of all claims exceeding the market value of the insured structure

Flood Mitigation Assistance (FMA)



- FEMA may contribute up to 90% Federal cost share for RL (Repetitive Loss) properties. An RL property is a structure covered by a contract for flood insurance made available under the NFIP that:
 - Has incurred flood-related damage on two occasions in which the cost of the repair, on average, equaled or exceeded 25% of the market value of the structure at the time of each such flood event; and
 - At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost compliance coverage.
- Twelve (12) properties are eligible for FMA:
 - None of the properties are SRL or RL.

Flood Mitigation Assistance (FMA)



- Applications have been submitted for residential properties that met the criteria for eligibility. These properties were also submitted for and approved for HMGP pre-applications.
- The deadline is May 13, 2016.
- Applications for residential acquisitions have been submitted. These total \$1,125,000. The local match is \$375,000.
- This activity supports the First Priority Ranking, Voluntary Residential Property Acquisition/Buyouts, of the Top Ten HMGP Project Categories.
- If and when one of the programs approves funding, the request to the other agency will be withdrawn.

Richland County CDBG-DR Project Categories



CDBG-DR Project Category Priorities

****ACTION REQUESTED****



1. Residential/Non-Residential Reconstruction/Rehabilitation/Relocation
2. Voluntary Residential Property Acquisition/Buyouts
3. Storm Water Drainage Management
4. Voluntary Non-Residential Property Acquisition/Buyouts
5. Data/Offsite IT Infrastructure
6. Flood Studies
7. Economic Resiliency
8. Mitigation of Flood Damage to Fire Suppression Water Capacity Systems
9. Conservation Easements
10. *Public Outreach

* Please note public outreach efforts are a continuous and integral component of all Project Category Priorities.

Richland County Flood Mitigation Alternatives Assessment

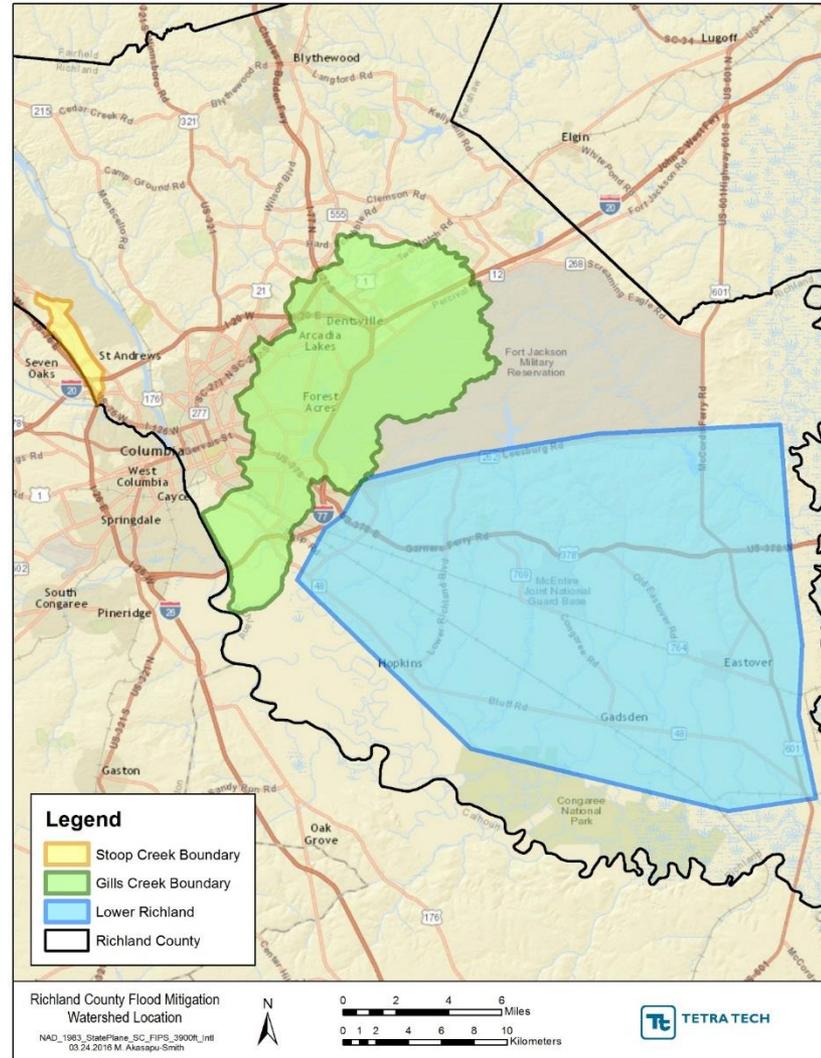


Richland County Flood Mitigation Alternatives Assessment



Richland County Administration, at the request of County Council initiated this study to better prepare for future storms by identifying mitigation strategies.

- Gills Creek Watershed
- Lower Richland County
- Stoop Creek Watershed



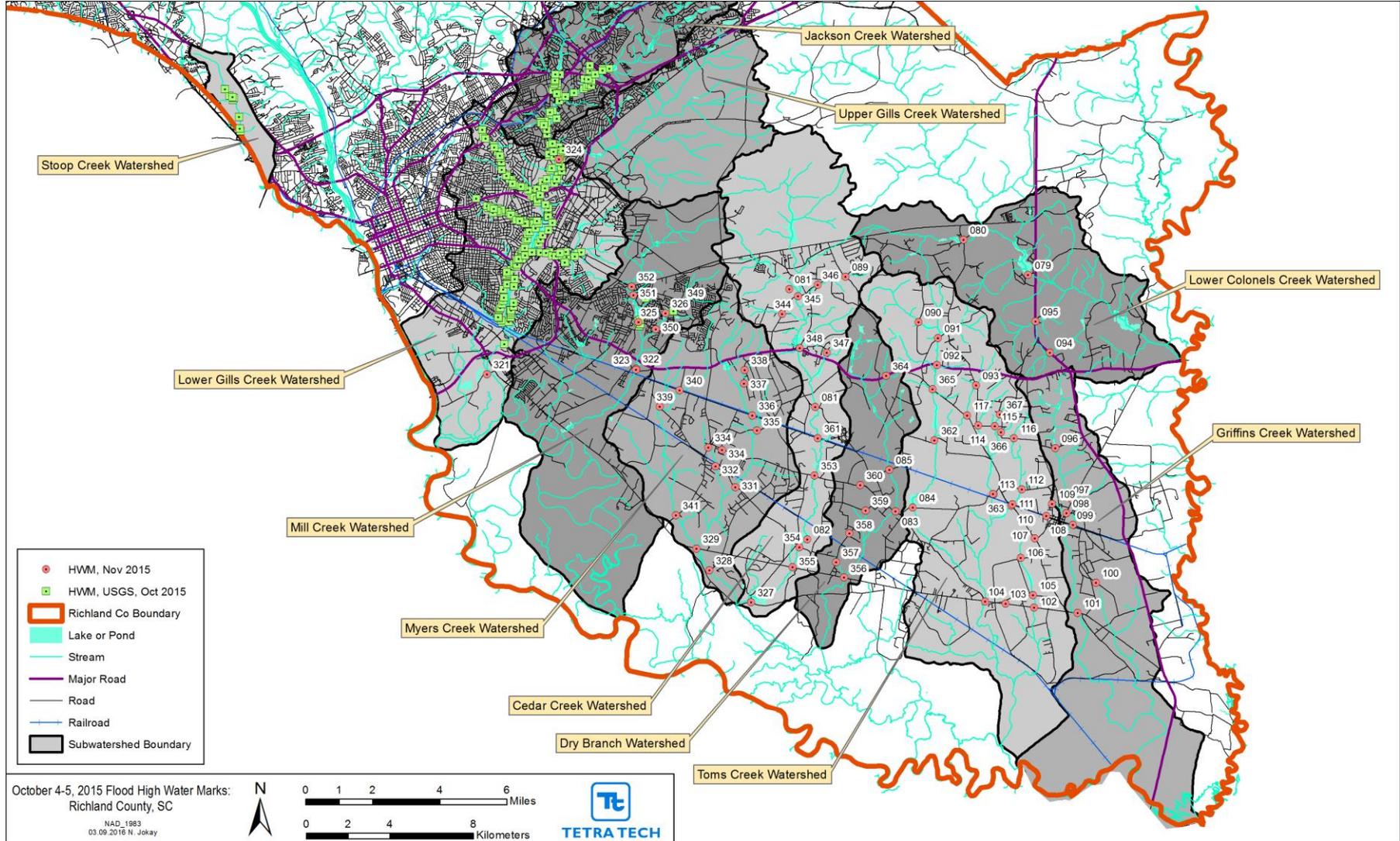
Richland County Flood Mitigation Alternatives Assessment: Project Approach



- Collected High Water Marks
- Reviewed Existing Management Plans and Damage Assessment Data
- Held Public Meetings
- Performed Technical Assessments
- Developed Mitigation Recommendations
- Developed Detailed Cost Opinions



Richland County Flood Mitigation Alternatives Assessment: Collected High Water Marks (HWMs)



Richland County Flood Mitigation Alternatives Assessment: Reviewed Existing Management Plans



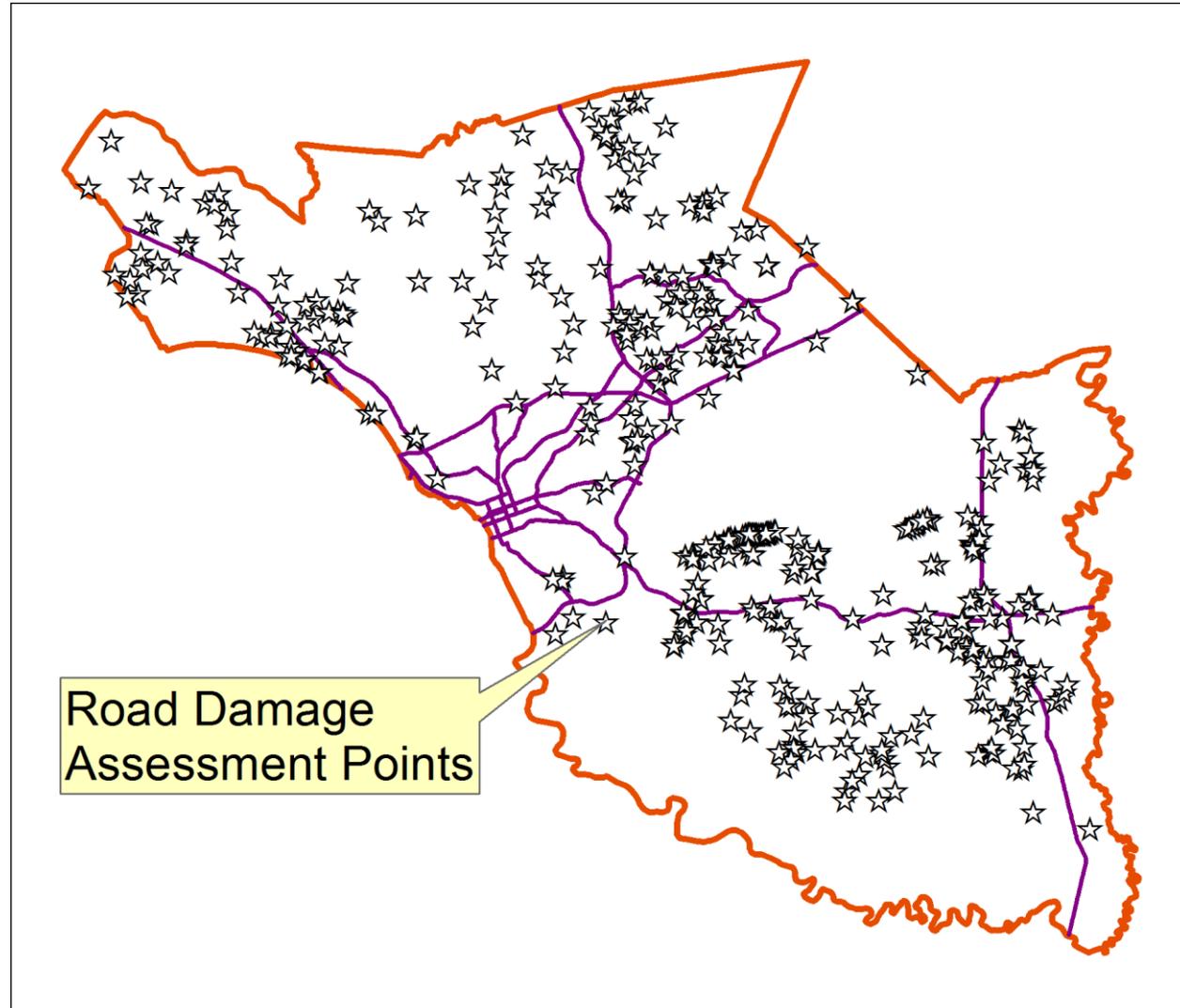
- Gills Creek Watershed Flood Mitigation Plan (March 2015)
- Richland County Stormwater Management Plan, A 25-Year Roadmap (April 2015)

Project ID	Project Title	Project Description	Total Budget (Estimated)
30	Denton Drive Stabilization	Stabilize the ditch line using and retrofit the regional detention pond to handle the flows in the neighborhood.	\$254,870.00
33	Devil's Ditch Maintenance	Stabilize the ditch line to reinforce the stream banks and prevent excessive erosion.	\$416,000.00
113	Spring Valley Little Jackson Creek Stream Mitigation, Stream Restoration Regenerative Stormwater Conveyance	Stabilize the ditch line using regenerative stormwater conveyance and remove sediment from the pond.	\$1,500,000.00
112	Soil Stabilization and Stormwater Improvements – Owens Field/Gill's Creek SW_01	Richland County is proposing the mitigation of existing and future flood impacts by enhancing an ongoing project in the Owens Field Park. The project is a joint project with the City of Columbia to renovate the existing trails, frisbee golf course, soccer fields, and parking lots as well as to enhance existing stormwater controls and add new ones. The project needs additional funds to complete all of the Stormwater Best Management Practices, which are designed to detain and infiltrate runoff into Devil's Ditch and Gills Creek. The project will mitigate existing and future flooding impacts by retaining water on-site during storm events. The project needs an additional \$100,000 to complete all of the proposed stormwater controls.	\$133,333.33
126, 127	Stormwater Infrastructure Inventory Improvements	Update inventory of stormwater assets; inspect pipe and infrastructure using a camera and note condition and any maintenance issues. Create a replacement planning model to get understanding of repair and replacement costs and criticality model for assets once data updated.	\$2,000,000.00
129	Property Acquisition Policy	Create a policy for acquisition of property impacted by flooding in lieu of construction of flood control projects. Policy will include when and how to evaluate properties for potential acquisition, including determination of the benefit-to-cost ratio and the procedures for purchasing those properties.	\$25,000.00

Richland County Flood Mitigation Alternatives Assessment: Reviewed Flood Damage Assessment Data



- Performed in October, 2015
- About 418 locations were documented
- Results compiled into a digital geodatabase



Richland County Flood Mitigation Alternatives Assessment: Held Public Meetings



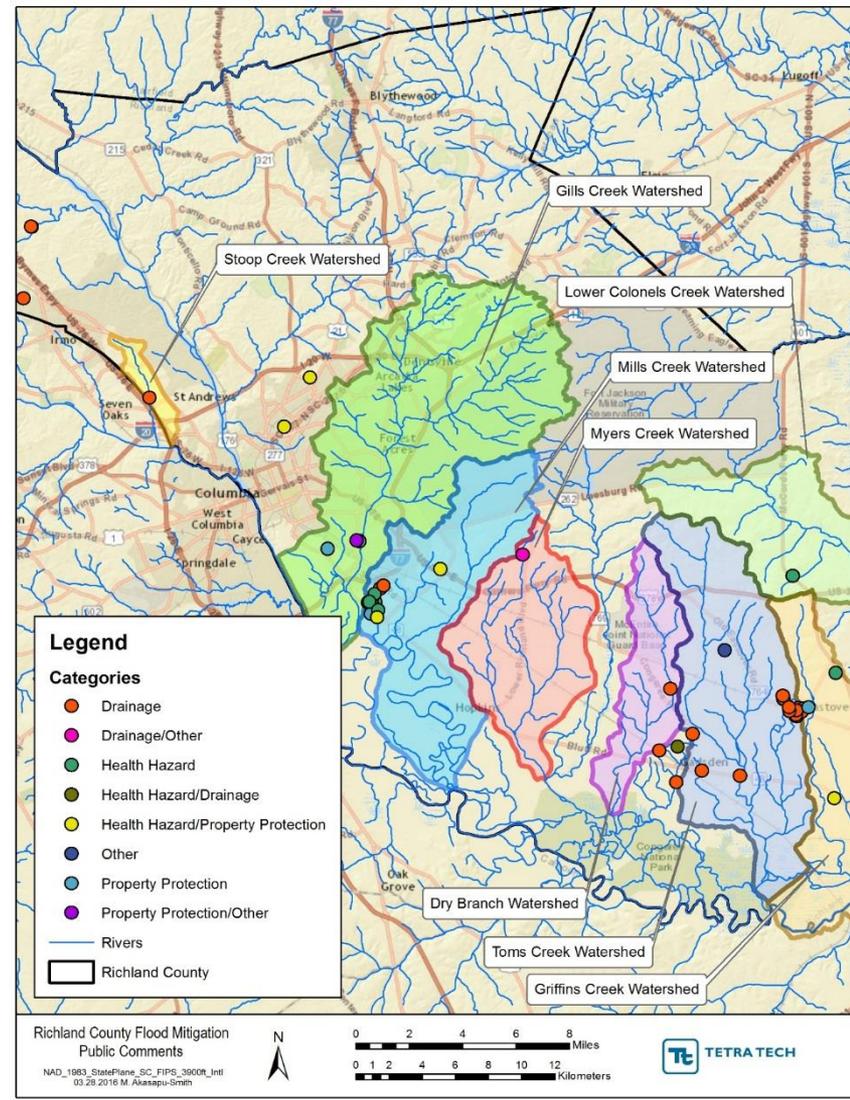
- Richland County and Tetra Tech coordinated 6 public meetings

Date	Time	Location	Address
January 19, 2016	5:30 p.m.–7:30 p.m.	St. Andrews Park	920 Beatty Rd., Columbia
January 20, 2016	12:00 p.m.–2:00 p.m.	Gadsden Park	1668 Goodwin Cir., Gadsden
January 20, 2016	4:00 p.m.–6:00 p.m.	Garners Ferry Adult Activity Center	8620 Garners Ferry Rd., Hopkins
January 21, 2016	12:00 p.m.–2:00 p.m.	Bluff Road Park	148 Carswell Dr., Columbia
January 21, 2016	5:30 p.m.–7:30 p.m.	Trenholm Park	3900 Covenant Rd., Columbia
January 23, 2016	12:00 p.m.–2:00 p.m.	Eastover Park	1031 Main St., Eastover

Richland County Flood Mitigation Alternatives Assessment: Held Public Meetings – Feedback Received



- 51 comments were compiled
 - 30 related to Drainage/Conveyance
 - Home Damage, Failed Septic, and Mold
 - Property Protection/Acquisition





Seven (7) Maintenance Concerns from Public Meetings

Street	City	Watershed (LR, GC, SC, O)	Suspected Causes	Comments
Tavineer Dr.	Columbia	GC	Plugged ditch behind yard.	Floodwaters come from debris filled ditch behind property.
Harlem St.	Columbia	GC	Ditches along road need to be cleaned.	Water got in the house and has caused mold on furniture.
Tavineer Dr.	Columbia	GC	Storm drains are clogged with trash.	Roads stay flooded longer when it rains. Concerned about mosquitos.
Atlas Rd.	Columbia	GC	Storm drains are clogged with debris.	Standing water in front and back yard. Stands for 2 or 3 days.
Congaree Rd.	Gadsden	LR	Ditches are clogged with debris	Storm ditches dug in 1970's have not been maintained.
Bluff Rd.	Gadsden	LR	Oct 1-5 flood	Ditches need to be cleaned out.
St. Marks Rd.	Gadsden	LR	Oct 1-5 flood	Ditch behind home needs to be maintained. Culverts under St. Marks Rd need to be cleaned.



- I. **Property Protection.** Actions that reduce potential damage to buildings, infrastructure, and other kinds of physical property (including property acquisition/relocation, elevation, or flood proofing buildings).
- II. **Structural Projects.** Infrastructure improvement that use or modify structures to mitigate a flooding hazard (such as replacement or retrofit of bridges and culverts, protection of critical utilities and infrastructure).
- III. **Flood Damage Prevention and Planning.** Actions that lower flood elevations or prevent future losses (such as culvert modifications, bridge modifications, stormwater conveyance modifications, channel and floodplain modifications, floodplain reclamation, and adoption or amendments of land use regulations, building codes, or flood damage prevention regulations).



Richland County Property Acquisition Project

- Tetra Tech agrees with priority acquisitions defined by the County



Corner of Timberlane and Glenhaven Dr. Houses pictured are actually on stilts (18 ft.).



Older picture (2012). Typical "big" flood. Corner of Timberlane and Edmond Dr.

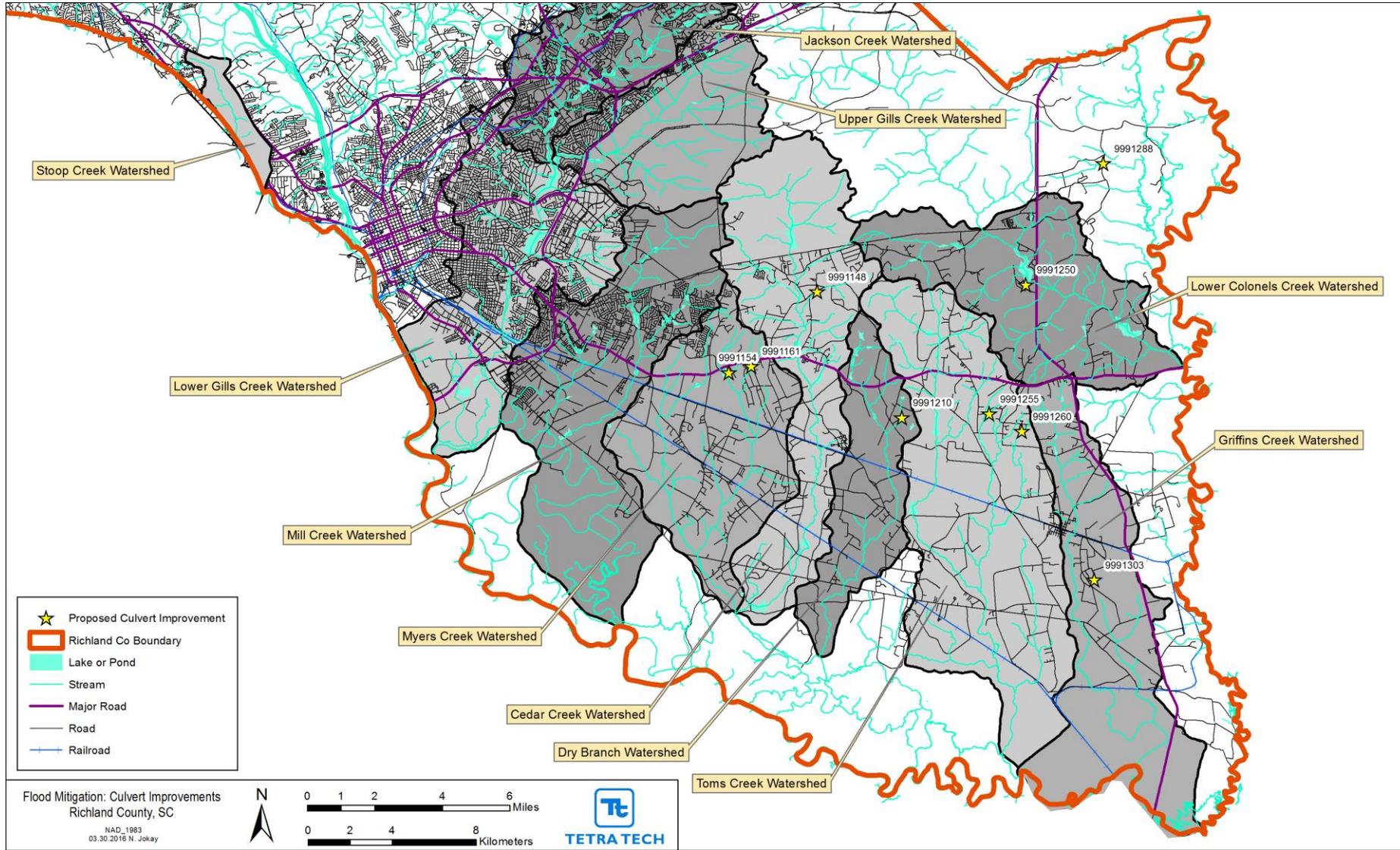
Richland County Flood Mitigation Alternatives Assessment: Structural Project Recommendations



Nine (9) Recommended Culvert Replacements

Structure ID	Street	Design Year	Existing Pipe Diameter (in)	Recommended Culvert Replacement per HY-8	Cost	Exhibit
9991148	Goff Pond Rd.	50-yr	24" and 18"	Double 5' x 3' Concrete Box Culvert	\$76,247	6-26
9991161	Saddlebrook Ln.	25-yr	48"	6' x 4' Concrete Box Culvert	\$70,378	6-27
9991260	Cross Creek Ln.	25-yr	24"	4' x 2.5' Concrete Box Culvert	\$36,509	6-28
9991288	Screaming Eagle Rd. Ext	50-yr	24"	Double 5' x 3' Concrete Box Culvert	\$72,917	6-29
9991303	Timbleside Rd.	50-yr	18"	Five 6' x 2.5' Concrete Box Culverts	\$165,370	6-30
9991154	Revere Rd.	50-yr	24"	Five 4' x 2.5' Concrete Box Culverts	\$56,798	6-31
9991210	Essie Bell Rd.	25-yr	15"	Triple 3' x 2' Concrete Box Culvert	\$40,015	6-32
9991250	Lake Dogwood Cir. S	25-yr	15"	24" RCP	\$38,907	6-33
9991255	Billie Jacobs Rd.	25-yr	18"	4' x 2.5' Concrete Box Culvert	\$43,020	6-34
Total					\$600,159	

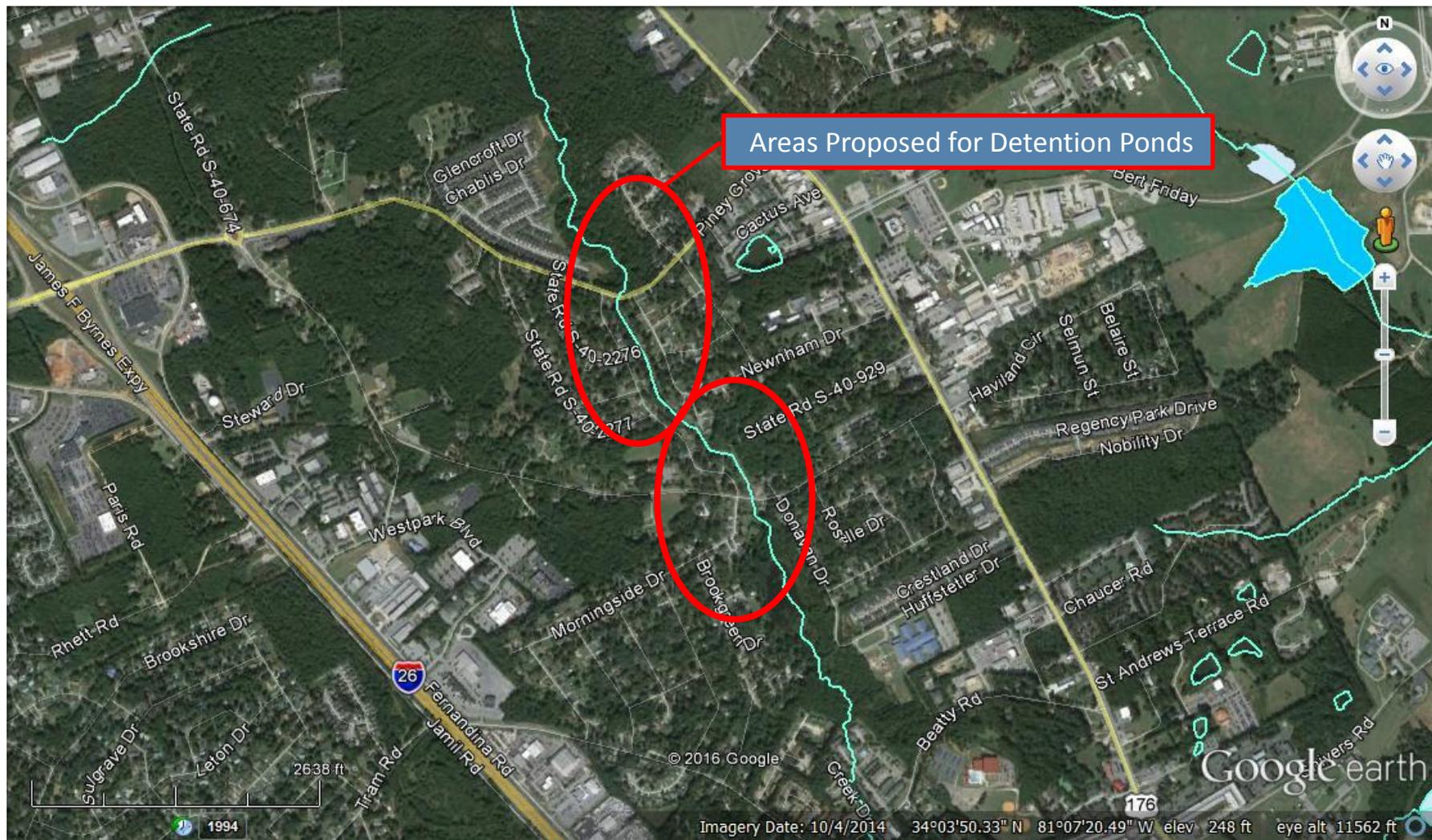
Richland County Flood Mitigation Alternatives Assessment: Culvert Replacement Locations



Richland County Flood Mitigation Alternatives Assessment: Flood Damage Prevention Recommendations



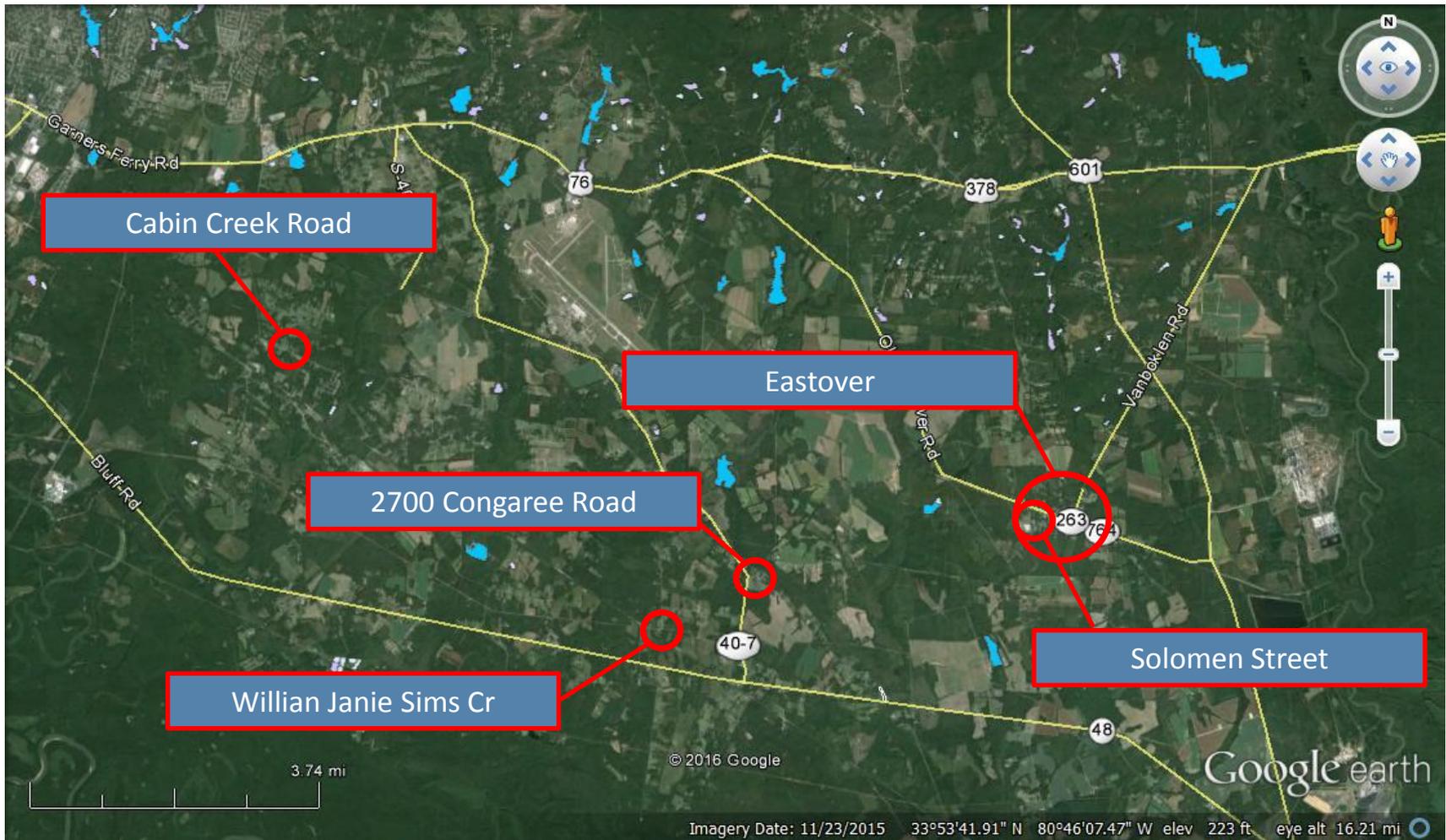
Two (2) Detention Basin Recommendations along Stoop Creek



Richland County Flood Mitigation Alternatives Assessment: Enhanced Conveyance Projects



Five (5) Stormwater Conveyance Modifications/Enhancement Projects in Lower Richland County



Richland County Flood Mitigation Alternatives Assessment: Enhanced Conveyance Projects

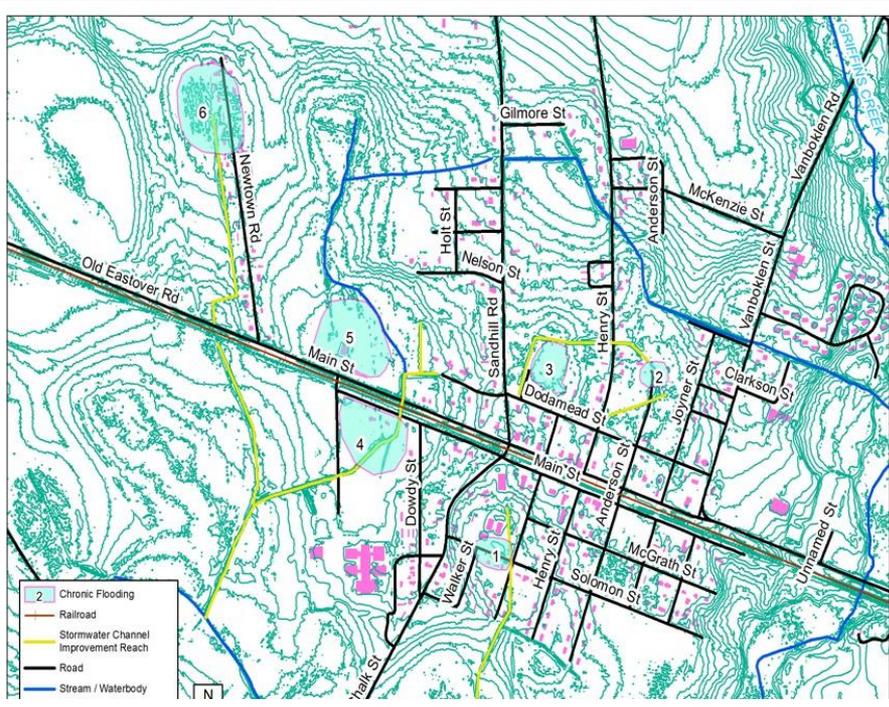


**RICHLAND COUNTY
 FLOOD MITIGATION STRATEGIES
 STORMWATER DRAINAGE CHANNEL IMPROVEMENT**

TETRA TECH



**EXHIBIT
 6-40**



Site Location	
City	Eastover

Project Narrative

Chronic flooding impacts properties throughout the town of Eastover. The town is located within a field of geomorphic features known as "Carolina bays." These Carolina bays are slightly elliptical low areas in which stormwater runoff tends to collect. In Eastover, the Carolina bays are generally linked by a drainage channel network. However, the network was constructed many decades ago and does not function adequately. Areas marked 1-6 on the map are known locations of either chronic flooding or generally poor drainage with the known drainage network marked in yellow.

This project involves improving the approximately 11,000 feet of channel in the existing drainage network. Improvements may include regrading the slope, enlarging the cross section, and clearing obstructions. Other improvements that should be considered during final design include adding streetside swales to promote infiltration and increased flow.

Area 5 includes the US Post Office. The stream and drainage channel to the north and east should be evaluated relative to the railroad grade to the south to determine if the railroad grade acts as a choke point.



Solomon Street, looking west. Rise at end of street is rim of Carolina Bay at intersection of Solomon and Chalk St.

Planning Cost Estimate		
Type	Notes	Total
Survey	Lump Sum	\$8,000
Design	Includes 10% of Construction Cost and surveying needs	\$20,416
Utility Relocation Cost	None identified	\$0
Construction Cost		\$204,158
Total Planning Estimate		\$232,574

Costs



Gills Creek:

- Affirm projects recommended in existing studies
- 46 property acquisitions

Lower Richland County:

- Affirm projects recommended in existing studies
- 17 property acquisitions
- 9 culvert replacements
- 5 stormwater conveyance modifications/enhancement projects

Stoop Creek

- 2 detention basin recommendations

Next Steps

